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Murray's experiments undertaken to determine the method of the diffusion of the conidia of the potato disease (*Peronospora infestans*). Microscopic slides coated with glycerine were exposed on the lee side of an infested potato field, and carefully examined at intervals of from ten to twelve hours, *i. e.*, at 9 A. M. and 7 P. M. No conidia were caught during the night, but upon the twenty-eight square inches of surface exposed during the day, there were caught in the first day 15 conidia; in the second, 17; in the third, 27; in the fourth, 4; in the fifth, 9. Considering the small amount of surface exposed by the slides, and the fact that only about two per cent. of the potato plants in the field were diseased, the number of conidia caught is very large.—— Henry M. Douglas, of South Richland, N. Y., has undertaken to translate the successive numbers of the *Botanische Zeitung*, as they appear.—— Queen & Co., of Philadelphia, have prepared a series of twenty-four slides of microscopical specimens illustrating many points in the histology of the higher plants. They are neatly mounted and will be useful to many teachers and students.—— The *American Monthly Microscopical Journal* has, during the past year, contained many valuable botanical articles; among these may be mentioned several Notes on Fresh-water Algæ, Double-staining of Vegetable Tissues, The Salmon Disease and its Cause, besides many upon Diatoms. The microscope is now indispensable to the botanist, and it is encouraging to find that microscopical journals are beginning to make themselves useful to him also.—— *Science* has now a botanical department.—— W. P. Schimper's herbarium (of mosses) has been purchased by the Kew Herbarium.—— In Nos. 46—50. of *Botanische Zeitung*, Goebel publishes an interesting paper on the Morphology and Physiology of Leaves, accompanied by a plate with many figures.—— In No. 50 of the same journal Strasburger's paper on cells with several nuclei, and some points in the embryogeny of Lupinus, promises to be of considerable value. —— A new and thoroughly revised edition of Rabenhorst's Cryptogamic Flora of Germany, Austria and Switzerland is announced. Of the first volume (Fungi), the first part is now ready.

ZOÖLOGY.

DESCRIPTION OF A HERMAPHRODITIC PHYLLOPOD CRUSTACEAN (EUBRANCHIPUS).—The single specimen of *Eubranchipus vernalis* here described was found in January, 1880, in a small, isolated pool, near Maspeth, L. I., living in company with a great number of a pale, transparent race of *Eubranchipus vernalis* Verrill. The hermaphrodite belonged to form A, as already pointed out in a paper read before the American Association for the Advancement of Science, in August, 1880.

Owing to my often taking it out for closer inspection, it died after having been kept in the aquariam for three days.

Genital Organs.—The female side consisted exteriorly of two closed protuberances, a larger, less pointed one, opposite the cirrus, corresponding with the valvule, and a smaller one a little above the middle of the sac where the muscle m^2 is inserted. The internal female organs were but poorly represented, consisting of a somewhat triangular "oviduct," with its two elongate termini closed and suspended by three principal muscles. The latter anastomosed with the generally intricate mass of muscles. (The latter is omitted in Fig. 1.) Muscle m^1, of Fig. 1, was inserted near the larger, outer protuberance broadly spreading over the anterior terminus of the oviduct, the muscle (m^3) below the posterior terminus of the oviduct, and muscle (m^2) was inserted in the second smaller, outer protuberance.

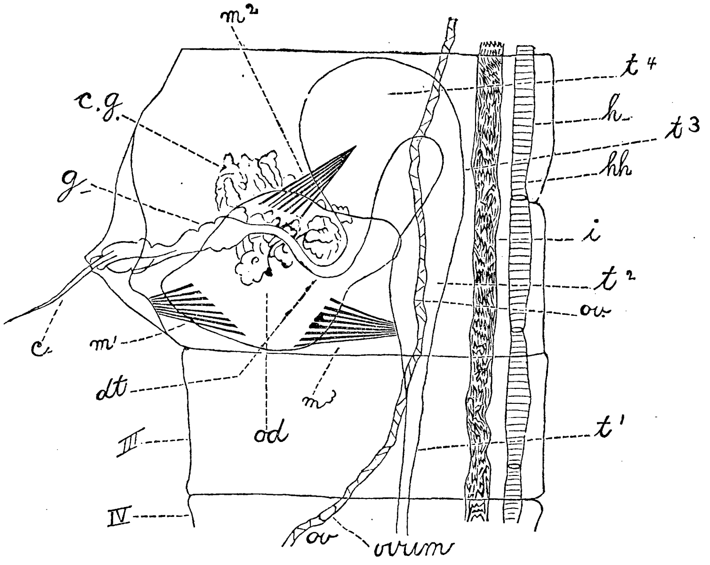

FIG. 1.—Hermaphroditic form of *Eubranchipus vernalis* V. The first three post-abdominal segments. *h*, heart; *hh*, ostium of heart; *i*, intestine; t^1, testicle; t^2, 1st dilated part of test.; t^3, contr. part or vas. def.; t^4, 2d dilat. part or sem. ves.; *dt*, duct ejac.; *g*, glandular and access. app.; *c*, cirrus; III, 3d post-abd. segt.; IV, 4th post-abd. segt.; *ov*, ovarial twisted string; *od*, oviduct, *ovum*-egg; *c.g.*, cement-glands; m^1 m^2 m^3, muscles of the oviduct.

This outer protuberance was constantly contracting and expanding itself, the area of the motion was exteriorly confined to this small protuberance only. The rhythmic contraction of the three principal fascicles revolved the "oviduct" to about one-fifth of its shorter diameter, in a semi-lateral direction.

There was no dissepiment between the male and female sac, and the interior uterine second sac was entirely absent in the female half.

The ovarial string passed up from the post-abdomen behind the detached "oviduct" and thence up to near the last left branchiped. The portion of the ovarial string passing through the genital segments was slightly moved backward and forwards, apparently by some hyaline fibers of the intricate mass of muscles connected with the "oviduct."

A single elongate white ovum *(ovum)* could be observed in the ovarial string in the fourth post-abdominal segment, near the third, during the entire time of observation.

The cement-glands were irregularly distributed in clusters around the posterior and middle part of the oviduct, the larger of them being between the latter and the male organs. The glands were all of a dark-brown color, which did not change during the time of observation, and were slowly moved to and fro by the network of muscles. The exterior of the female side was comparatively not as largely expanded as usual in normal individuals.

The internal male organs were of their normal course, shape and position; the exterior of the same presented, owing to the pointed lateral protuberance, the peculiar figure indicated by drawing Fig. 2, dorsal view. The male side was voluminously swollen out anteriorly.

The female clasper (Fig. 3 *a*) was normal and of the form of those of the red Eubranchipus; the male clasper (Fig. 3 *b*) also presented the form of those of the normal red form, and was in its entire length very finely corrugated; the tips of both, the longer and shorter branch of the clasper were less corrugated than in the normal individuals. The tentacles on right side only and normal. Cirrus normal, neither dentate nor perforate.

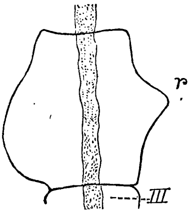

FIG. 2.—Dorsal view of genital sac (exterior) of hermaphroditic Eubranchipus. *r*, right side; *III*, third post-abdominal segment.

Note.—I suspect the lateral protuberance on either side of the genital segment to be the exterior rudiments of a second evagination,. corresponding with cirrus or valvule, the antimeres or duplicates of each exterior member, the female sac being in this case but a closed large protuberance.

This imperfect hermaphrodite may be compared with a male and female individual of Eubranchipus grown together side by side, the limbs, etc., in general consolidated, the male and female outer claspers, cirrus and valvule, being preserved (the latter also partly degenerated) along the median connate line, leaving the antimeres of the latter two external organs rudimentary in the shape of a protuberance or little knob on the lateral line.

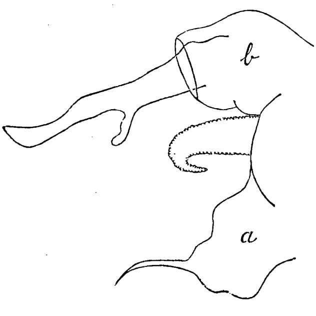

FIG. 3.—Head of hermaphroditic Eubranchipus.

The order in which the organs of reproduction and their auxiliaries make their appearance in Branchiopodidæ, is as follows: 1. Genital glands; 2. External genitals (Spangenberg's paper, p. 42), and 3. Auxiliary organs (claspers).—*C. F. Gissler, Ph.D.*

HABITS OF THE ENGLISH SPARROWS IN THE UNITED STATES.—The severe handling which that little immigrant, the English sparrow *(Passer domesticus)*, has of late received on all sides in the United States, and especially from our men of science, has sometimes made me feel disposed to consider the little fellow over abused, and has tempted me to say a word in his favor. But as even his enemies acknowledge he is more to be feared than despised, and as he has also not been without his advocates, I have hitherto refrained from interfering, and have remained a silent looker on.

One day in the early part of the month of January, 1880, during a high wind, a bird house occupied by birds of this species, and attached to a tree growing in the grounds connected with one of our public institutions, was brought to the ground by the giving way of a decayed branch. I was surprised to find it completely filled with a mass of rubbish consisting of dried grass, straw, weeds of various sorts (principally Amarantus and Chenopodium), horse hair, thread, rags, paper and feathers. The entire arrangement forbid the supposition that it was intended for nesting purposes, and an examination of the other sparrow-houses in the extensive grounds established the fact that they were similarly furnished. It was clearly a provision on the part of the bird against the cold of our severe winters. The gardener, who looked at it in the same light, informed me that he had to clean out this rubbish from the houses every spring at nesting time, and that it was not their nests, which are altogether different. This is exceedingly interesting as pointing to the capacity for self-improvement in the species. I have failed to find any description of such a habit in the English sparrow, and it would seem to have been acquired since its advent to our shores; though it would be important to know whether it adopts this precaution against the cold in the more northern countries of Europe.

A short time before the above-mentioned occurrence, one of those birds, in the same grounds, was noticed as being sick. Several of the other sparrows waited most assiduously upon it with affectionate care, and kept it supplied with food which they continually brought it. During the night a "cold snap" set in, and the next morning the sick bird was seen, perched on a railing, its companions hovering over it with evident anxiety, and bringing it food which they tried to make it eat. On going up to the bird, it was found to be dead and frozen stiff. This incident exhibits the species in a very different light from that in which it is usually represented by its American biographers.

But now comes the other side of the picture. In the following

April, at the blossoming of the peach, which this year was unusually early, I saw, one morning, two English sparrows busily at work on a peach-tree in my yard, and, on going nearer, perceived they were nipping off the blossoms with terrible rapidity. The ground was already strewn with scores of the crimson flowers, and I have no doubt that, unless interrupted, the tree, which is of a fair size, would have been utterly stripped—to the last bud, within less than half an hour. Close watching failed to discover the object of the birds, whether they were in search of insect or vegetable food, or whether their action was an exhibition of mere wantonness or destructiveness, which latter conclusion it would be difficult to receive. On the following morning another of the species was found similarly employed on a neighboring peach-tree, which was being just as rapidly denuded of its blossoms. The flowers were nipped off by the bird's beak, at the peduncle, a short distance below the receptacle, as neatly and swiftly as though done with a pair of scissors. This opened to my gaze such a horrible vista as to the destructiveness of the bird, that I turned away aghast at the spectacle. At this rate a few pairs of this sparrow would destroy the crop of an entire peach orchard in the course of two or three days. It cannot be, however, that this is a general habit of the bird, as our peach crop this season was the most abundant which we have had for years; fine peaches being retailed here, early in the season, at as low as three cents per quart.

Considering the destruction wrought by insect pests in our Southern States, I have thought this sparrow would prove of great benefit to that region, saving millions of dollars in the cotton, corn, vegetable and tobacco crops. The climate would also seem to be more suitable for it, particularly during the winter.—*Henry Gillman, Detroit, Michigan.*

INTELLIGENCE IN A CAT.—The chief of our pets is "Shorty," a castrated cat now fourteen years old. Of course he has led a very quiet, dignified life, always at home, and never addicted to roof music at nights. He is a dear old fellow—neat and tidy in his habits, and taking the presence of any kind of filth as a matter of deep disgust and offence. In his middle age—avoirdupois sixteen pounds—he was a "mighty hunter." His greatest recorded feat being the killing of nine rats in one pleasant afternoon. It is an abomination in his ears to have them pierced by the "discordant noises" of a cat fight. One day, years ago, two younger felines engaged in an animated discussion with claws and teeth, filling the air with yells and flying fur. "Shorty" heard it, and ran in a succession of flying leaps to the spot. He bounded in between the two "bad boys," separating them in an instant. There he stood for a brief space, eyeing first one and then the other, with his right paw elevated, and growling fiercely. The youngsters drew down their arched backs, the bristling tails collapsed, and they left the spot, each in a different direction, at the command of the peace maker. He once "brought up" a motherless kitten. At first, he was highly indignant at the presence of the little one, but finally took charge of it most kindly and tenderly, allowing it to suck his rudimentary teats. He afterwards weaned it, and then hunted for it, precisely as a "mother kitty" would have done! "Shorty" seems always *sensible* of the fact, if any of the family are ill or feeling blue or discouraged; in such cases he springs into one's lap and purrs his loudest, *looking* his sympathy most unmistakably, as much as to say, "Don't feel badly—don't be discouraged!" On one occasion a lady of the family while suffering from a severe attack of toothache, burst into tears. "Shorty," who was regarding her intently, sprung upon her lap, and placing a paw on each side of her neck, looked into her face, giving utterance to frequent and piteous mews. That his friend was suffering grievously, he *knew* as well as anybody, and he manifested his sympathy and regret in quite as decided a manner. Many anecdotes of the old fellow are treasured up in the legends of the family, but the above are probably as characteristic as any. He is now in "the sere and yellow leaf," being afflicted with "rheumatics" when the weather is heavy, and having lost his under tushes, but we cherish him for the good he has done, and for the kindly sympathy he has always manifested for his friends.—*Chas. Aldrich, Webster city, Iowa,* 1880.

Curious Habit of a Dragon-Fly.—One day this summer when I was looking at some tadpoles in a dish of water, I was struck in the face by a jet of water. On searching for the cause, I found that the larva of a dragon-fly (Æschna) was my assailant. When disturbed it sent out a fine stream of water from the branchial apparatus in the caudal end of its body to the distance of two or three feet, and not content with one volley, it would wheel and discharge, like a small gun, at all points of the compass. I put it in a tumbler of water, and it lowered the front of the body, and shot the water far over the edge of the glass. I cannot say it ever took deliberate aim, but I know I got sprinkled many times when I inadvertently touched the glass.

Prof. Packard, in writing of the larval dragon-fly, says, "By a syringe like apparatus lodged in the end of the body, it discharges a stream of water for a distance of two or three inches behind it, thus propelling the insect forward. The apparatus combines the functions of locomotion and respiration." (Guide to the Study of Insects, p. 601.)

If all Æschnæ have the same habits as the one I caught, we must add that the apparatus is also a means of defence.—*Sarah P. Monks.*

Migrations of the Sand-Hill Crane.—I had to-day a fine opportunity to watch the migrations of the sand-hill crane, and observe their method of managing their flight under adverse circumstances, that is with a strong wind in the rear. They were flying at great height, and during two hours several hundred passed over, going towards the south-west, the wind at the time being nearly due north and blowing quite hard. They would proceed in the ordinary manner for a short time, and then when the wind apparently became too strong for them, would wheel round and face it, and allow themselves to be carried along by it in the same way that a fish sometimes lets himself be carried down a rapid current, tail foremost, by simply putting forth just strength enough to keep his head up stream. When the wind slackened they would again wheel and pursue their way to repeat the same manœuvre a little further on. This might seem to be a very slow mode of traveling, but after watching a number of flocks I concluded that their rate of translation could not be much less than that of an ordinary railway train.—*F. E. L. Bent.*

ZOÖLOGICAL NOTES.—The last report for 1878 of Prof. Baird, as Fish Commissioner, contains an elaborate descriptive essay on the *Pycnogonida* of New England and adjacent waters, by Mr. E. B. Wilson. These spider-like forms, formerly placed with the Crustacea, are now generally acknowledged either to form an aberrant group of Arachnida, or a group intermediate between the Crustacea and Arachnida. This is, except an earlier paper by Mr. Wilson, the first systematic treatment of these animals in this country, and the report is supplemented by excellent figures with many details. —— It is by some supposed that the *Monera* of Haeckel is a premature group and should be merged with the genuine Rhizopods; however this may be, a new (*Monopodium kowalevskyi*) has been discovered at Naples by K. Mereschkowsky. It has no nucleus, the point of distinction between Monera and Rhizopoda.——As regards the importance of *Foraminifera* to the doctrine of descent, Professor Moebius, contrary to Carpenter's opinion that owing to their unusual tendency to variation they were not of much value to the evolution theory, believes that as confirmatory of Darwin's theory of descent, they possess a value neither greater nor less than that of all other classes of animals.——As the last contribution to the question as to the origin of the radial symmetry of the Cœlenterates, Prof. John Young has argued from the order of development of the septa and tentacles, that the radiate form of Cœlenterates arises from the shortening and crowding together of the successive septa either side of a line of bilateral symmetry, by which an apparent radiation around the mouth is produced. ——Among recent ornithological publications is Dr. Coues' Third Installment of American Ornithological Bibliography. It forms over five hundred pages of the Bulletin of the U. S. Geological Survey of the Territories, v, No. 4. This, with the two other parts, "represent a nearly complete bibliography of ornithology, so far as America is concerned." The annual report of Capt. G.

M. Wheeler, Corps of Engineers, for 1879, contains an ornithological report on observations and collections made in portions of California, Nevada and Oregon, by Assistant H. W. Henshaw. Mr. Henshaw is now in Oregon and Washington Territory, taking the census of the Indian reservations in that region, but will doubtless find opportunities for ornithological studies in that interesting section.——Under the heading "Infusoria as parasites," Mr. W. S. Kent, in the *Popular Science Review*, enumerates ten species of *Flagellata* and fifteen species of *Ciliata* which are genuine parasites in the viscera of birds, frogs, &c., ducks and geese, house-fly, the blood of Indian rats, a nematode worm, the common cockroach, a myriopod (Julus), a water beetle, earthworm, a marine planarian of several fresh water snails, besides Dr. Salisbury's *Asthmatos ciliaris*, which he regards as an active agent in the production of one form of hay asthma or hay fever.——In a recent paper in *Kosmos*, Fritz Müller describes a Brazilian fly *(Paltostoma torrentium)* with two forms of females.

ENTOMOLOGY.[1]

LARVAL HABITS OF BEE-FLIES (BOMBYLIIDÆ).—In the last number of the *American Entomologist*, we gave from advance sheets of the Second Report of the United States Entomological Commission an account of the larval habits of Systœchus and Triodites, showing that they prey on locust eggs, and drawing the following conclusions:

The discovery of the "parasitism" of these bee-flies upon locust-eggs at once suggests a comparison with the similar diversity of parasitic habits among the Meloidæ as given in our first report, some of them infesting bee-cells, while others, as the true blister-beetles (Lyttini), feed on locust eggs.

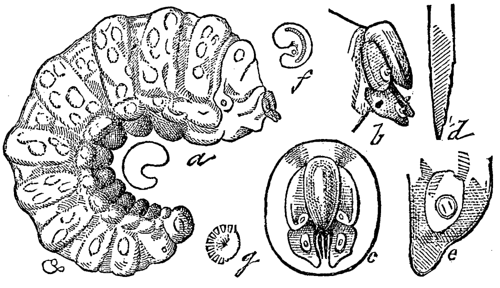

FIG. 1.—*Systœchus oreas; a*, larva; *b*, head, from side; *c*, do., from front, partly withdrawn into first joint; *d*, left mandible; *e*, left maxilla; *f*, prothoracic spiracle; *g*, anal spiracle (after Riley).

The Anthracids are now united by the best authorities with the Bombyliidæ, of which family as a whole Osten Sacken has said, they are "perhaps the most characteristic and one of the most abundantly represented families of Diptera in the western region, including California." The abundance of blister-beetles is also well known to characterize this region, and we have shown how this abundance is connected with the abundance of locusts. It is

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[1] This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.